$(36-31.736)\div 2=2.132$ in. thickness of shell.

This problem was solved with same result, by *Hon. Josiah H. Drummond, J. F. W. Scheffer, Frank Horn J. K. Ellwood, and Cooper D. Schmitt.*

39. Proposed by P. C. CULLEN, Superintendent of Schools, Brady, Nebraska.

A, *B*, and *C* start from same point at same time. *A* north at rate of three miles per hour. *B* east at rate of four miles and *C* west at rate of five miles per hour. *B* at end of two hours starts at such an angle as to intersect *A*. How long after starting must *C* start north-west in order to meet *A* and *B* at common point?

Solution by HON. JOSIAH H. DRUMMOND, LL. D., Portland, Maine, and J. W. WATSON, Middle Creek, Ohio.

Let x be the time after *B* turns till he meets *A*. The route of both is a right angle triangle with base 8; perpendicular $3x+6$, and hypotenuse $4x$. Hence, $16x^2=(3x+6)^2+64$, whence $x=7\frac{1}{7}$ or -2. But the -2 value makes them turn back and meet at point of starting. Let y=time before *C* turns. Then $7\frac{1}{7}+2-y$=time after he turns. $3x+6=1\frac{2}{7}\frac{2}{7}$=perpendicular, $5y$=base, and $5(\frac{6}{7}\frac{4}{7}-y)$=hypotenuse. Hence, $25y^2+(\frac{1}{7}\frac{9}{7}\frac{2}{7})^2=25(\frac{6}{7}\frac{4}{7}-y)^2$, whence $y=2\frac{1}{7}\frac{6}{7}\frac{2}{5}$ hours.

Excellent solutions of this problem were received from *G. B. M. Zerr, P. S. Berg, J. K. Ellwood, Cooper D. Schmitt, and J. F. W. Scheffer.*

40. Proposed by F. P. MATZ, M. Sc., Ph. D., Professor of Mathematics and Astronomy in New Windsor College, New Windsor, Maryland.

Find the market-price of $m=3\%$-stock, in order that it may yield $n=3\frac{1}{8}\%$ interest after deducting $d=\$\frac{7}{2\,0}$ from every $S=\$12$.

Solution by the PROPOSER.

According to the conditions of the problem, the deduction from the the par ($100) value of a share is $100d\diagup S$ dollars, $=\$1\frac{5}{8}$; therefore, $100(1-d\diagup S)$ dollars are to yield $\$m$ interest. In order to yield $\$n$ interest,

the market-price must be $P=100\left(\frac{m}{n}\right)\left(1-\frac{d}{S}\right)$dollars, $=\$87\frac{3}{8}$.

COR.—Put $m=n$; then $P=\$97\frac{1}{1\,2}$, which is the correct result of this problem as proposed in the December, '94, MONTHLY.—*F. P. M.*

41. Proposed by F. P. MATZ, M. Sc., Ph. D., Professor of Mathematics and Astronomy in New Windsor College, New Windsor, Maryland.

If I gain $2 in $5 by selling a horse for $150, what per cent. would I gain by selling the horse for $120?

Solution by P. S. BERG, Apple Creek, Ohio, and the PROPOSER.

Since gaining $2 in $5 is gaining 40%, the cost of the horse is $\$107\frac{1}{7}$. Hence the gain required is 12%.

PROBLEMS.

46. Proposed by T. W. PALMER, Professor of Mathematics, University of Alabama.

A borrows $500.00 from a Building and Loan Association and agrees to pay